STAGES

Newsletter of the
Early Life History Section
of the American Fisheries Society

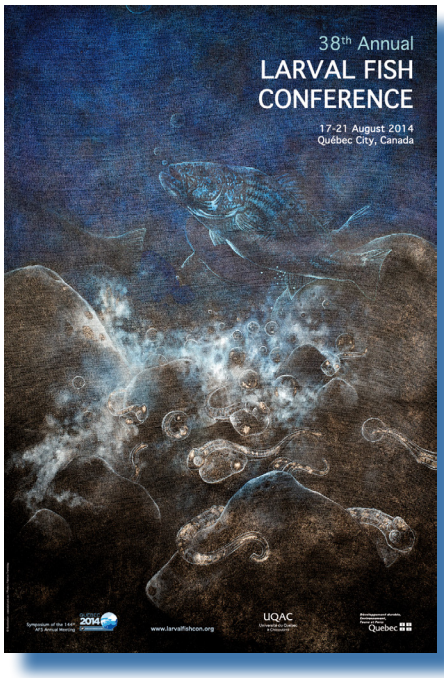
Volume 35, Number 2 | Lee A. Fuiman, Editor | June 2014

38th Annual Larval Fish Conference Registration

Online registration for the 38th Annual Larval Fish Conference, to be held in Québec City in conjunction with the 144th annual meeting of the American Fisheries Society from 17 to 21 August 2014, is now open here under "Events/Registration."

We are delighted to announce that the conference will feature over 140 contributions from 15 countries. To fit the AFS meeting schedule of presentations and events, we needed to plan parallel sessions throughout the meeting. AFS acknowledges the specificity of the Larval Fish Conference, and will either provide rooms that are adjacent or located within the same area of the conference centre. Keynote presentations as well as the "A Tribute to William C. Leggett" special session will be held in plenary.

The presentation schedule will be published by AFS shortly. A detailed version of the schedule will then be published on the Larval Fish Conference website. In the meantime, please note that the Larval Fish Conference will run from Monday August 18th (PM) to Thursday August 21 (PM). A Larval Fish Conference social will be



...continued on p. 8

President's Message

This is my last message as President of the ELHS as I will turn the lead to Myron Peck at the upcoming LFC meeting in Québec City in August. Frank Hernandez will hand over the responsibility of Secretary to Fred Scharf. First of all I'd like to give a big thank you to Frank for his great job as Secretary and to the newcomers for volunteering to take the new positions. Many thanks also go to all the other officers and committee chairs for all the work they are doing in the background and all of you for your interest and support in keeping our section active and special. Without you all, there would be no functioning ELHS.

I have enjoyed my tenure as President, since it is fun to represent such a lively and dedicated community. Although we are a small group, we can have quite an impact and the interest in our field of work is visible in the great response of scientists coming to our meetings.

With me and Myron, as upcoming President, a European perspective has been added. I'm not sure everyone is happy with that, but it has widened our recognition and can help the scientific world to grow together even more. The offers of colleagues to host LFC meetings in

...continued on p. 14

Inside this issue

ELHS Back Then

10 years ago: Newsletter Editor Perce Powles steps down after almost 5 years. Lee Fuiman takes over." [Ed: looks like my time to go is long overdue; any takers?]

15 years ago: John Dower takes over as ELHS webmaster, moves the website to a server at UBC and gives it a new design.

20 years ago: ELHS celebrates 15 years as an AFS Section"

25 years ago: 13th LFC was held in Merida, Mexico, hosted by Mote Marine Lab; 150 participants (13 countries), >100 papers and posters

30 years ago: Term of Section President extended from 1 year to 2 years. Bob Hoyt is first 2-year President.

Deadline for material to be included in the next issue of ***Stages****:*

September 5, 2014

News from the Regions

European Region

Hubert Keckeis

from: Audrey Geffen, Arild Folkvord, University of Bergen

Fish larvae in the classroom

There are several courses on fish larvae scattered around the globe, but few of them run as full semester courses giving time for an experimental study. At University of Bergen we have two larval fish courses: a lecture/seminar course led by Arild Folkvord, and a hands-on larval rearing course led by Audrey Geffen. What can you do with fish larvae over a whole semester? Plenty!

Larval Fish Ecology covers central topics in recruitment biology of fishes. The lectures deal with relevant recruitment mechanisms in fish populations with emphasis on processes regulating growth and survival in the early life history of fishes. The importance of early life studies of fishes for management of fish resources is also highlighted, often taking a starting point with Fuiman & Werner's book *Fishery Science: The unique contributions of early life stages*. The seminar part is based on student presentations of papers from selected topics which vary from year to year. In addition to the pleasure of having an entire semester (5 ECT points) to talk about fish larvae, there are concrete learning outcomes focused on the major developmental events and constraints in the early life history of fishes; the role of the physical environment on the distribution, growth and behaviour of early life stages; the major recruitment mechanism hypotheses underlying variations in fish population abundance; and a basic knowledge of possibilities and limitations of otolith microstructure and chemistry analyses in elucidating early life history characteristics. Working with classic and current literature, the students also learn to extract relevant information from aquaculture and marine juvenile production studies and apply them to field and fisheries-related research.

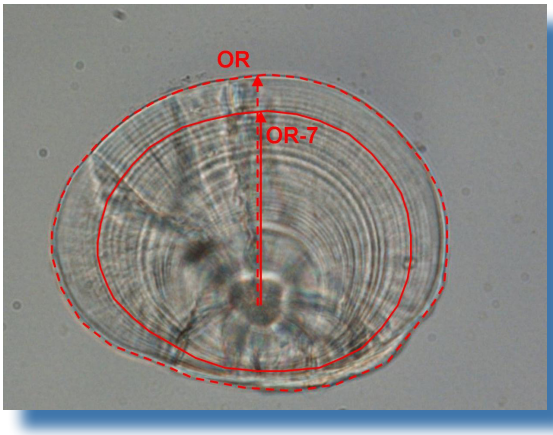


Photo of larval cod otolith – demonstrating the use of radius-at-age to study size-selective processes.

For those of our students who are willing to endure wet floors, cold water, crashing algae cultures, and the risk of electric shock from heaters in the *Artemia* hatching tanks, we have the course *Marine Juvenile Production* (10 ECT points). In this course, students learn the theory and practice of larval rearing through exercises that cover topics such as developmental staging, gamete quality, feeding rate, live prey manipulation, otolith analysis, and more. Short term (2-4 weeks) experiments are planned and executed by the whole class, or else individuals and groups take on mini-projects on particular skills or topics. The species that are used in the course depend on availability, adding a realistic amount of stress to the air. Herring and cod are the species we include most often, but we have also worked with hake, haddock, and wrasse eggs and larvae. The students compile the results of the mini-projects and experiments into a joint report with and oral presentations. We have experimented with different presentation styles also: in 2012, we studied parental effects in larval herring and used the results in a formal debate, with the question before the house being "Are mothers or fathers more important?" We've just completed this year's experiment, testing the effects of live prey manipulation in a "food quality vs quantity" scenario.

...continued on p. 10

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HELP KEEP STAGES INTERESTING...

Send us a report of your research activities.

Southern Region

Frank Hernandez

from: Anthony Overton, East Carolina University

What Happens When an Estuary Gets Thirsty? – Juvenile Fish Community Responses to Drought Conditions in Large Estuaries

Tracy McCulloch, Nick Tolopka, Zach Gillum, Anthony Overton

Determining how fish respond to environmental changes is a question of interest for many biologists. In estuarine habitats, environmental conditions can change rapidly with tides, variable river flows, and salinity gradients. Larval and juvenile fishes use estuaries as nursery grounds, adjusting to these changes daily. Long term data sets are becoming more readily available to investigate fish distribution, abundance, and assemblage structure, with tools to determine which environmental factors are likely to produce the observed patterns. In estuaries where environments are harsh, but highly productive, knowing which environmental variables are most influential on species distribution and abundance could help simplify complex ecosystem dynamics to better understand the effects of regional and global climate change. We used exploratory multivariate analysis to examine the spatial and temporal variation in fall juvenile fish assemblages in North Carolina. Our data set covered 25 years, four riverine estuaries, two coastal lagoon locations, and one small bay located behind a barrier island. Despite differences among individual rivers and estuarine habitats, estuarine fish assemblages responded similarly to years of severe-to-extreme drought conditions, when freshwater flows were at record lows. Some species, including silversides, red drum, bay anchovy, and mojarras, decreased in average total abundances during drought years, while pinfish and spot seemed to take advantage of these conditions, experiencing an overall increase in average total abundance during the same drought periods. Spatially, fish assemblages responded to zones of lower salinity on the two large river estuary systems, the Pamlico-Tar and the Neuse Rivers. Increased average total abundances of bay anchovy, silversides, and spot were observed at stations with lower salinities, while mojarra, pinfish, and red drum average total abundances declined. While salinity was not determined to be a factor in our exploratory analysis, pairwise comparisons of salinity between years and between stations found significant differences for both. Determining if fish assemblages are responding to river flow, increased salinity due to low flows, or cascading effects of low flows and increased salinity, such as changes in primary production, trophic cascades, or hypoxia warrant further investigation. It cannot be overstated how useful sampling programs such as these can be for management purposes, as well as developing a better understanding of the ecology in these systems. Though many sampling efforts are often initiated with single species as a target, it has become increasingly clear how valuable these databases can be for examining long term community trends, climate impacts, or the effects of stochastic events.

from: Lee Fuiman, University of Texas

How essential fatty acids in diet impacts the growth, survival, and behavioral performance of larval southern flounder (*Paralichthys lethostigma*)

Erik Oberg and Lee Fuiman

Southern flounder (*Paralichthys lethostigma*) is a prized game fish species found in the Gulf of Mexico, but wild populations have declined in recent years. The Texas Parks and Wildlife Department has implemented a stock-enhancement program and the species is a candidate for commercial aquaculture, but more research on larval rearing is needed. At the University of Texas Marine Science Institute, Erik Oberg (MS graduate student under direction of Lee Fuiman), is examining the impacts that different levels of dietary fatty acids have on larval southern flounder (*Paralichthys lethostigma*). The objective is to better understand larval nutrient requirements to improve intensive culture of the species. To do this, captive spawned southern flounder eggs were hatched and reared at a temperature of 18 °C and salinity of 33.5 ppt. Larvae between 4 days posthatch (dph) and 15 dph larvae were fed one of four live prey diets. The diets were rotifers enriched with different combinations of fatty acid emulsions. At 15 days, approximately the midpoint of the pelagic larval stage, larval fitness was quantified by measuring growth, survival, and behavioral performance. Incorporation of fatty acids into the tissues was also measured to see if certain fatty acids were accumulated differentially into the head or body. This was done by carefully sectioning the heads and bodies of 15 dph larvae and analyzing the fatty acid composition using gas chromatography and mass spectrometry. The results of this study are currently being analyzed, but differences in the variables measured and the fatty acids of the diet and tissue sections could help elucidate the relative importance of certain fatty acids to larval southern flounder. Ultimately this work may provide new information about the early nutritional requirements of this species, and thus improve stock-enhancement efforts to recover the fishery and future commercial aquaculture ventures.

Effects of noise on larvae of a subtropical estuarine fish

Lisa Havel, Christopher Wilson, Lee Fuiman, University of Texas Marine Science Institute

and Preston Wilson, University of Texas Applied Research Laboratory

A research team at the University of Texas (UT) is completing a project combining physiology, acoustics, and behavior to determine the potential effect of anthropogenic noise on larval fish foraging behavior. Noise in

...continued on p. 15

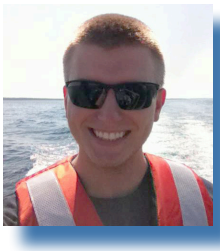
North Central Region

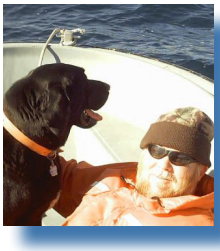
Frank Hernandez

from: Ed Roseman, USGS Great Lakes Science Center

Research on Fish Spawning and Larval Fish Habitat in the St. Clair – Detroit Rivers System (SCDRS) and Western Lake Erie.

Kevin Keeler and Ed Roseman





U.S. Geological Survey Great Lakes Science Center (GLSC) scientists from Ann Arbor, Michigan, continue their engagement in multi-jurisdictional fish early life history (ELH) studies in the Great Lakes connecting channel composed of the St. Clair River, Lake St. Clair, Detroit River, and western Lake Erie. A majority of this work is funded through the Great Lakes Restoration Initiative (greatlakesrestoration.us) and the USGS Science Support Program. These grants have allowed the GLSC to build and improve its infrastructure and ability to conduct ELH studies by adding new small research vessels with capabilities for sampling fish eggs and larvae in nearshore coastal waters and large rivers, adding new sampling equipment (to include nets, egg collection pumps and mats, and underwater cameras), laboratory equipment including digital image analysis systems and microscopes, and to recruit talented scientists with ELH experience as well as specialists in river survey techniques and use of advanced technologies. This sampling season marks the 9th consecutive year of ELH research and assessments conducted in the SCDRS by USGS and its partners.

R/V Sander *and USGS-GLSC crew heading to study sites within the Detroit River to lift and process egg-mats used to assess the extent of fish spawning in the river.*

Patricia Thompson and other USGS crew picking and counting fish eggs from egg-mats lifted from the Detroit River in April 2014.

Objectives of the work in the SCDRS include gathering contemporary data and information on fish use of spawning and nursery habitats in the corridor. This includes an ambitious sampling program to document the phenology and spatial extent of spawning on various natural and man-made spawning habitats in the system using benthic egg mats and pumps to provide indices of egg abundance. Larval fish assessments include sites in the main river channels, embayments, and in the few remaining wetland complexes along the rivers, as well as in the St. Clair River delta. Collected eggs are reared in the newly renovated wet lab at the GLSC in order to verify egg identification using hatched larvae and to provide tissue samples for genetic stock analyses. Egg collections reveal a diverse ichthyofauna including a mix of native fishes which spawn in the SCDRS ,such as walleye, lake whitefish, lake sturgeon, several catostomid species, yellow perch, and various minnows, as well as transient larvae, such as rainbow smelt, cisco, and deepwater sculpin, which drifted from Lake Huron. Indices of egg abundance are about an order of magnitude higher in the Detroit River than the St. Clair River for all species except lake sturgeon, which have higher egg densities in the St. Clair River. Data from these collections are being used in several modeling efforts by numerous researchers at state, federal, provincial, and university laboratories to assess the role of fish production emanating from the SCDRS in comparison with other tributaries and western Lake Erie. Efforts are also underway to develop a subset of larval fish sample sites into long-term monitoring stations to provide an early life history context to the overall structure and function of the SCDRS fish community.

...continued on p. 10

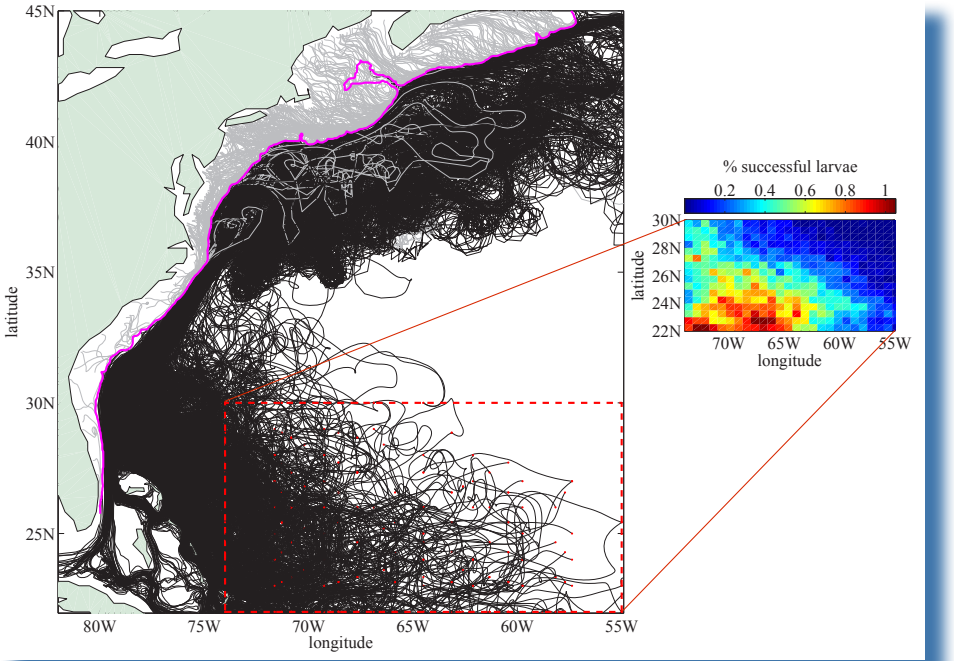
McDonald jars (top) in the USGS-GLSC's newly renovated wet lab facility featuring egg-rearing systems. Eggs (bottom) were collected on egg mats in the Detroit River and are being hatched to verify identity.

Northeast Region

Dave Richardson

from: Woods Hole Oceanographic Institution

Colleagues at Woods Hole Oceanographic Institution (WHOI) and Duke University have a new paper in press that examines the dispersal of American eel larvae from the Sargasso Sea. Physical oceanographers Irina Rypina (WHOI), Larry Pratt (WHOI), and Susan Lozier (Duke) teamed up with larval fish ecologist Joel Llopiz (WHOI) to develop a coupled physical-biological model illustrating a couple interesting results about one of the ocean's more mysterious fishes. By running several different scenarios with and without swimming behavior, they showed evidence for directional horizontal swimming (vs. passive drift and random-walk-style swimming) being essentially required in order for larvae to reach vast portions of the North American continental shelf, including offshore of the Gulf of Maine and Canada where we know glass eel ingress to occur in large numbers. Further, by examining the release locations in the Sargasso Sea of the successful larvae (i.e. those reaching the shelf), their model also provided some insight into the potential spawning location of American eel (see figure). The highest densities of successful larvae were released from a small portion of the southwestern Sargasso Sea, which is consistent with — but of a substantially smaller size than — spawning area estimates stemming from larval survey data. Hopefully this work will stimulate (or reinvigorate) efforts to understand the orientation cues and capabilities of anguillid larvae, and to observe and document the occurrence of adult eels on their spawning grounds. Be on the lookout for the paper in an upcoming issue of *Limnology and Oceanography*.



A subset of larval trajectories successfully reaching the 200 m isobath (magenta) from a coupled physical-biological model for American eel larvae. The simulation covered 1995-1999, was based on 5 million simulated particles, and included diel vertical migration, directional swimming with a Gaussian distribution of angles, swimming speed increasing to 6 cm s-1 over 1 year, and mortality. The small inset shows probability (in %) of successful larvae as a function of larval release location.

from: Rutgers University Marine Field Station

The contributions of Rutgers University Marine Field Station (RUMFS) to the early life history of estuarine fishes continue to grow. The Coastal Collaboration on Recruitment (CCOR) effort is continuing. This is a U.S. east coast wide effort to determine recruitment patterns for estuarine dependent fishes based, primarily, on weekly time series of larval fish ingress. As part of this effort Ken Able and his research group are collaborating with individuals continuing larval ingress time series at Beaufort Inlet (NMFS – Todd Kellison, Chris Taylor; North Carolina State – J. Buckel), North Inlet (Belle Baruch Laboratory – D. Allen) and their own at Little Egg Inlet. They are also providing these data to state and federal fishery biologists along the east coast to assist in stock-assessment analyses of economically important species as part of a grant from the National Estuarine Research Reserve Marine Science Collaborative. This effort is also consistent with NOAA's Sentinel Sites Initiative. As another example, the Rutgers group is determining aspects of timing and location of reproduction, larval supply, ingress into estuarine inlets and post-settlement habitat for *Leiostomus xanthurus* led by Dennis Allen.

In another study, Ken Able's lab is evaluating the multiple sources of larvae spawned in the ocean that are supplied to Barnegat Bay, New Jersey, including Little Egg Inlet (our long term study site), Barnegat Inlet, and the Intracoastal Waterway from the Manasquan River estuary. Special attention is focused on ingressing *Anguilla rostrata* glass eels (Able et al. in review). New ichthyoplankton sampling locations in Barnegat Bay have documented the presence of larvae of southern species not previously found during long-term sampling efforts. Two *Gobiesox strumosus* larvae were collected from the intake of Oyster Creek Nuclear Generating Station in July 2013 and two more, one from Barnegat Inlet, one from Manasquan River estuary, were collected from sampling sites in August 2013. This species has not been collected from Little Egg Inlet in more than 24 years of weekly ichthyoplankton sampling. Adults of this species were collected

...continued on p. 14

Western Region

Dan Margulies

from: Darrel Snyder, Colorado State University

Matt Haworth, a graduate student at Colorado State University with the Larval Fish Laboratory, won the Colorado-Wyoming Chapter of AFS Best Student Paper Award for his presentation entitled "Reproduction and recruitment dynamics of flathead chub relative to flow regime in Fountain Creek, Colorado," co-authored by Kevin R. Bestgen, both of the Larval Fish Laboratory, Department of Fish, Wildlife, and Conservation Biology, Colorado State Univ., Matt.Haworth@colostate.edu.

Matt Haworth (left) receives Colorado-Wyoming Chapter of AFS Best Student Paper Award.

Abstract: Flathead chub *Platygobio gracilis* is a North American cyprinid with a historic distribution spanning the Great Plains region from Canada south to the Gulf of Mexico. Populations have declined regionally and flathead chub is now considered abundant in only a portion of its historic range. In Colorado, flathead chub is presently listed as a Species of Special Concern. A stronghold exists in Fountain Creek, an Arkansas River tributary that may be altered by a municipal water project. To better understand potential effects of flow manipulation, we are investigating the reproduction and recruitment dynamics of flathead chub in Fountain Creek.

In spring and summer 2012-2013, daily drift net and live egg samples documented an extended reproductive season for flathead chub, spanning May-August in both years. Daily increment counts from otoliths of larger age-0 flathead chubs were then used to construct distributions of hatching dates and identify timing and patterns of recruitment related to extreme flow events caused by summer thunderstorms. Understanding how flow regimes influence reproduction and recruitment will contribute to the understanding of flathead chub ecology, provide insight into how flow manipulations may affect fishes in Fountain Creek, and inform recommendations for their conservation.

Also, presented at the Colorado-Wyoming chapter meeting was a poster paper entitled: "Illustrations of Larval and Juvenile Development of the Suckermouth Minnow" by Darrel E. Snyder, Kevin R. Bestgen, and C. Lynn Bjork of the Larval Fish Laboratory, Colorado State University, darrel.snyder@colostate.edu.

Extended Abstract: The suckermouth minnow *Phenacobius mirabilis* (Cyprinidae) is a widespread midwestern and Central Plains fish native to the Mississippi River Basin, including the Ohio and Missouri River Basins, with isolated populations in western Lake Erie drainages and Gulf Coast rivers in Texas. The western extent of its native range includes the eastern plains of Colorado, Wyoming, and New Mexico, where populations have declined considerably and are now respectively considered state endangered, imperiled, and threatened.

It is moderately slender, terete, and seldom more than 100 mm TL (120 mm max). As its common name suggests, it has a subterminal to inferior mouth with prominent lower-lip lobes and a protractile upper jaw. The snout is long and blunt, eyes are positioned high, and gut is short and S-shaped with a silvery, speckled peritoneum. The dorsal fin begins forward of the pelvic fins and typically has eight principal fin rays; the anal fin typically has seven. The lateral line is complete with 40-51 scales.

Primarily a benthic insectivore, the suckermouth minnow typically inhabits riffles and faster runs over sand and gravel in small streams to large rivers of low to moderate gradient. Spawning occurs over a protracted season from April through August at 14-25°C. In the laboratory, spawning was observed in flowing water over gravel and cobble, but not sand, with fish vibrating side-by-side, pushing their anal fins against the substrate, and releasing one to a few eggs at a time. Fertilized eggs were spherical, 1.5-1.7 mm in diameter, demersal, and adhesive. At 17-23°C, eggs hatched in 3-4.5 days, yielding 4-5 mm TL larvae.

Knowledge of the morphological ontogeny of a fish is often critical to identification of its larvae and understanding its early life physiology, ecology, and behavior. In the only known description of suckermouth minnow larvae, 6.6-7.8 mm TL protolarvae were reported to have snout-to-vent lengths of 61-65% TL, 25-26 myomeres to the posterior margin of the vent and 12-13 after; protruding, shelf-like snouts; inferior, horizontal mouths, large pectoral fins, unpigmented dorsums except over the occipital region, and ventral pigment irregularly outlining the anterior gut, and 8.0 mm mesolarvae were reported to have completed yolk absorption. The description included photographs of one dorsal, one ventral, and three lateral views.

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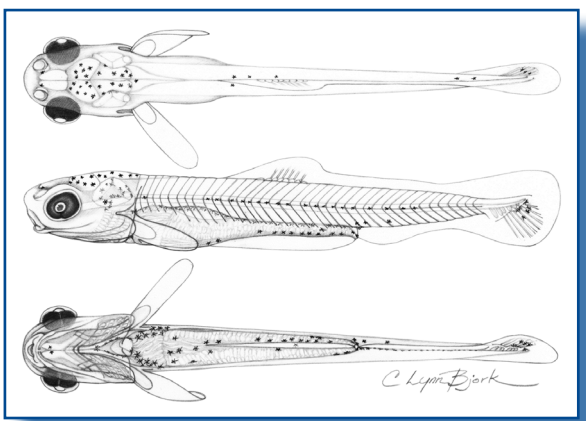


Suckermouth minnow Phenacobius mirabilis *(Cyprinidae), larva.*

Pacific Rim Region

Akinori Takasuka

Technical Achievement Award in Fisheries Science given to MOHT work

In a previous issue of STAGES (Volume 33, Number 3, October 2012), I reported the work on "New autonomous multiple cod-end opening/closing control system for a frame trawl" to introduce a research article published in *Methods in Oceanography*. A collaboration team led by Yoshioki Oozeki (National Research Institute of Fisheries Science, Fisheries Research Agency, Yokohama, Japan), Fuxiang Hu (Tokyo University of Marine Science and Technology, Tokyo, Japan), and Mr. Chiaki Tomatsu (Tsurumi Seiki Co., Ltd.) developed the Matsuda–Oozeki–Hu Trawl (MOHT) for late larval and juvenile fish sampling and produced new versions of the MOHT with autonomous multiple opening/closing control systems.

Finally, they received a "Technical Achievement Award in Fisheries Science" from the Japanese Society of Fisheries Science (JSFS) based on a series of their MOHT development work. This award is given to JSFS members who have made technically distinguished achievements and contributed to the development of fisheries science as well as the fishing industry. The award ceremony was held in Hokkaido on March 29, 2014, during the annual meeting of the Japanese Society of Fisheries Science, which was followed by the award presentation on March 30 (see image below).

Award recipients with the JSFS President after the ceremony. From left to right: Dr. Yoshioki Oozeki, Dr. Shugo Watabe (JSFS President), Dr. Fuxiang Hu, and Mr. Chiaki Tomatsu.

from: Gilles Ouellette, Angers, France

Cagayan River's Ludong and Catfish Conservation in the Philippines

Gilles Ouellette, CESO – Volunteer Adviser – Fisheries
(safari.extremefishing@yahoo.com)

A project designed to save the endemic Lobe River mullet or "ludong" (*Cestraeus plicatilis*) from extinction and restore the native Philippines catfish (*Clarias macrocephalus*) populations in Northern Luzon. Philippines coastal and inland fishery resources currently face an enormous risk of severe and irreversible depletion. Capture fisheries continue to be exploited at a non-sustainable pace and regional human population size may double by the end of the century.

What will become of today's northern Luzon fisheries? Will inland fisheries of Ludong in the Cagayan and Abra River be thing of the past if its management fate is only left in the hands of user groups?

This proposal advocates the participation of international R&D on biodiversity and resource conservation agencies to participate in this regional initiative initiated by Filipino fisheries managers and scientists of northern Luzon.

With the assistance of a Canada-funded NGO (Canadian Executive Services Organization) Cagayan State University at Sanchez Mira (CSU) and the Bureau of Fisheries and Aquatic Resources - Region 02 (BFAR-02) are teaming up to promote an Integrated Inland Fisheries Management and Aquaculture Strategy for both the ludong and the native Philippines catfish populations in Northern Luzon.

BFAR Catfish Hatchery region 2 staff with Gilles Ouellette (left) from CESO in hatchery

The strategy is dedicated to the development of an Inland Fishery management and Sustainable Aquaculture Training facility at the CSU-Sanchez Mira campus to support BFAR-region 02 Save the Ludong in the various stages of planning and implementation.

The Ludong and the native Philippines catfish populations in Northern Luzon R&D program will address the following general objective: To develop a comprehensive community-based Fisheries Management and Conservation Strategy for the ludong and the native Philippines catfish in the Cagayan and Abra River watersheds of northern Luzon.

Namely among other objectives the R&D program should make use of genetic DNA analysis to describe relative species composition, evaluate relative abundance between species, and map distribution/migration patterns for migrating larvae/juveniles caught during the Cagayan and Abra River watersheds survey in northern Luzon and the annual upriver run.

...continued on p. 16

Upcoming Events

ICES Working Group on Larvae and Egg Surveys

During 1-5 December we will organize our first WGALES (Working Group on Atlantic Larvae and Egg Surveys, www.ices.dk/community/groups/Pages/WGALES.aspx), meeting and we would like to invite you to participate. WGALES is an ICES group with the aim to bring scientists involved in ichthyoplankton surveys and research surveys together to discuss and exchange new ideas, techniques and developments on the surveys and analyses and to discuss specific topics which can be identified and addressed to WGALES by the ICES community. We especially encourage scientists from ICES, but also from outside the ICES community, working on ichthyoplankton surveys and related issues, to attend the meeting in order to gather expertise, discuss common questions, and exchange ideas with us.

WGALES will meet from 1 to 5 December in San Sebastian, Spain.

The setup of the meeting will be:

Monday afternoon: General WGALES business and subgroup on herring larvae surveys issues (ICES requests)

Tuesday – Thursday: workshop "Ichthyoplankton surveys and recent advances in egg and larval mortality studies"

Friday: General WGALES business (and subgroup on herring larvae surveys issues if necessary)

The workshop "Ichthyoplankton surveys and recent advances in egg and larval mortality studies" will have 2 sessions:

Session 1 – General presentations on surveys

Session 2 – Advances in egg and larval mortality studies

For session 1 we would like to invite presentations with a general overview of ichthyoplankton surveys within and outside the ICES region, directed at regular ichthyoplankton methodologies (for biomass estimation or other aims). We also encourage presentations on surveys that are not coordinated by ICES. Survey presentations can address methodologies, objectives and deliverables, extra data collected, historic overview of the surveys, issues and future developments.

For session 2 we welcome presentations on: sampling strategies and experiments (at sea and in the laboratory) for mortality determination, causes of natural mortality, comparisons between species and/or distribution regions, ageing procedures for eggs and larvae, models of eggs and larvae distribution and mortality with associated estimation procedures, accuracy and precision.

Next to the presentations we will also schedule time for discussions.

You are welcome to attend the whole meeting or parts of it. For those of you who would like to attend the meeting but are not able to travel to San Sebastian, we will open the possibility of following the presentations and discussions via Web as well (WebEx facilities or other depending upon the number of interested people).

Andrés Uriarte from AZTI has kindly agreed to host the meeting in AZTI's building. For the attendees, it is suggested that they make their booking directly in any of the hotels in the city centre of San Sebastian, e.g. Hotel Astoria7, TrypOrly or Niza.

Please let us know by email (cindy.vandamme@wur.nl) if you would like to attend the meeting. If so, please send to us the title and, if possible, a short abstract of the presentation(s) you would like to make. Please inform us of your participation by Friday 13 June.

We hope to meet you all in San Sebastian,

Maria Manuel Angelico (IPMA) and Cindy van Damme (IMARES), Co-chairs of WGALES

38th annual Larval Fish Conference...cont'd from p. 1

held on the night of Thursday, August 21st, following the "A Tribute to William C. Leggett" session. We recommend you to arrive in Québec City on or before Sunday August 17th, and stay until the morning of Friday August 22nd.

Because the meeting will be held during the tourist season, we encourage you to book your flights and accommodations as early as possible. As mentioned on the AFS meeting website (afs2014.org/accomodations), both the Delta and Hilton hotels are affiliated with the venue and offer special rates (but still expensive - $229 per night) to AFS delegates. That website also lists budget options for students. Several smaller hotels located in the Old Québec district (within 15 minutes on foot from the venue) offer reasonable rates (please check this site to locate hotels)

Don't hesitate contacting us if you have any questions. We are looking forward to welcoming you soon in Québec City! §

— Dominique Robert (dominique.robert@mi.mun.ca) and Pascal Sirois (pascal_sirois@uqac.ca), on behalf of the local organizing committee.

Kevin Bestgen Receives Award of Excellence

Kevin Bestgen, Director of the Larval Fish Laboratory at Colorado State University. (Image from vpr.colostate.edu.)

Dr. Kevin R. Bestgen, Director of the Larval Fish Laboratory at Colorado State University, Fort Collins, was presented the most prestigious award of the Colorado/ Wyoming Chapter of the American Fisheries Society, the "Award of Excellence," by Dr. Kurt Fausch during the Chapter's annual meeting banquet on March 6th 2014 in Laramie, Wyoming. In a letter of support for nomination of Kevin for the award, Darrel Snyder noted that the nomination was long over-due and wrote the following:

For nearly 30 years, beginning with his graduate studies at Colorado State University in the early 1980s, Kevin has studied, researched, and contributed significantly to the knowledge and conservation of fishes in the American Southwest. The focus of most of his work has been native and endangered species in Colorado, Wyoming, New Mexico, and Utah.

In 1989, after serving short stints as a Wildlife Technician with the Colorado Division of Wildlife, a contractor with the New Mexico Department of Fish and Game, and a Research Associate at the University of New Mexico, he joined the Colorado State University Larval Fish Laboratory and Department of Fishery and Wildlife Biology as a Research Associate. In 1997 he earned his Ph.D. and assumed the role of Director of the Larval Fish Laboratory. Today, as a Senior Research Scientist and Assistant Professor in the Department, he continues to lead the Lab as its Director.

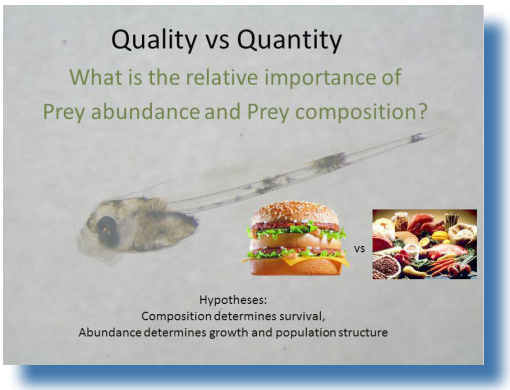
His expansive interests, research, and expertise in native fish taxonomy, systematics, ecology, behavior, reproduction, early life history, recruitment, and population dynamics have resulted in 30 formal publications, innumerable presentations, and more than 40 final project reports for contracting agencies including most local, state, and federal agencies, and recovery programs managing our regional fishes and aquatic ecosystems. [Needless to say, much of that work involved the collection or study of fish larvae.] In addition to his own and co-authored publications, he has served as a referee for well over a dozen journals, several book chapters, and a multitude of agency or recovery program final reports. He is frequently called upon as a guest lecturer and to offer special courses or workshops, including a regularly offered workshop on plains fish identification for Colorado Parks and Wildlife.

The hallmarks of most of Kevin's research are collaboration and cooperation with other in-house and outside researchers and managers and a dedication to detail and quality that have earned him and the Lab deep respect and appreciation among our colleagues, peers, and contracting agencies. He and his collaborators or research teams have documented the systematics, taxonomy, distribution, biology, and conservation needs of the Rio Grande silvery minnow; the loss of Rio Grande bluntnose shiner and phantom shiner from the Rio Grande; and the distribution, biology, and status of the Rio Grande chub in Colorado and the roundtail and Gila chubs, loach minnow, spikedace, and other fishes of the Gila River Basin in New Mexico. In eastern Colorado, they (and/or Kevin's students) have done the same for redbelly dace, lake chub, suckermouth minnow, plains and brassy minnows, and flathead chub, as well as document the historical records of all fishes in the eastern plains. But most of his or their work has focused on investigations and development of criteria or methodologies critical to understanding the biology, and facilitating and monitoring, the recovery of the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail in the Upper Colorado River Basin. Recognizing these and other valuable contributions, the Upper Colorado River Basin researchers group awarded him "Researcher of the Year" in January 2004, and last fall, during celebration of the Larval Fish Laboratory's 35th anniversary, the Upper Colorado River Basin Endangered Fish Recovery Program presented Kevin and the Lab with an "Award of Appreciation" for his and our ongoing contributions to the program. It's now time for the members of the AFS Colorado-Wyoming Chapter to do same and recognize the importance of Kevin's contributions throughout our region with our most prestigious "Award of Excellence." [And they did!]

P.S.: During that meeting, Kevin was also presented the Chapter's Best Paper Award for his presentation entitled "Phenotype predicts genotype for lineages of native cutthroat trout in the southern Rocky Mountains "– not ELH related, but still worthy of note. §

— Darrel Snyder

European Region...cont'd from p. 2



But starting in autumn 2014, we're joining these courses into a single course to give practical skills together with the basis for understanding the research methods and their applications to studies of growth, development, physiology, behaviour, and ecology of fish larvae (BIO 338 Early Life History Studies). As we say in the course description, we will cover central topics in early life history studies of fishes. The topics are presented through lectures, discussions, and laboratory experiments. The course content and skills are relevant for recruitment biology, aquaculture, hatchery production, fish development, and general larval fish ecology. The lectures will deal with recruitment mechanisms in fish populations with emphasis on processes regulating growth and survival in the early life history of fishes. The importance of early life studies of fish studies for management of fish resources will also be exemplified. The colloquium part will include student presentations of papers from selected topics (can vary from year to year). The laboratory activities will give practical skills in research techniques for larval fishes and basic methods for larval rearing in experimental and aquaculture environments, including live prey production. Methods for maintaining, measuring and studying early life history stages will be emphasized.

We hope this course will give students the ideal combination of intellectual and practical challenges, and contribute to developing new early life history researchers.

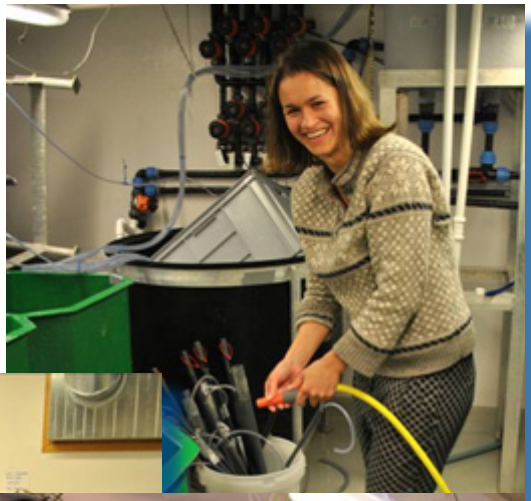
North Central Region...cont'd from p. 4

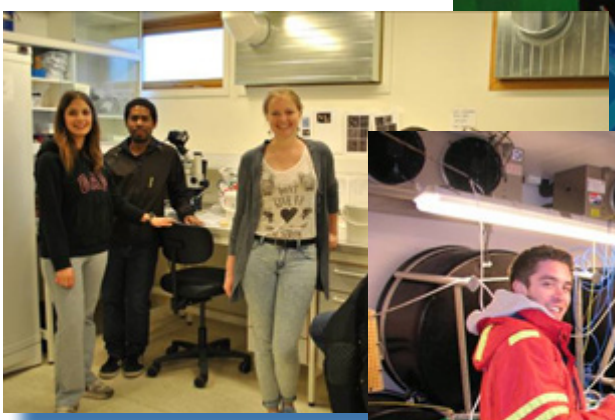
Obtaining these essential data, however, first requires evaluation of potential sampling sites. Physical habitat assessments have been a vital component in the creation of our man-made spawning reefs. This work is primarily completed by two methods; side-scan sonar (SSS) and acoustic Doppler current profiler (ADCP). SSS coupled with underwater videos collected during SCUBA dives were used to characterize surficial sediments for potential reef construction sites. Substrate composition maps are then used in conjunction with GIS systems to display the sediment distribution throughout the study sites. Potential restoration sites place emphasis on areas in which the surficial sediments indicate a low probability for natural spawning but also characteristics ideal for the placement of reef material. Habitat assessments have also been enhanced by using the Sontek MP ADCP. The tool determines flow patterns (based upon depth and total discharge) and changes in the riverbed for a candidate site to guide decisions on future construction of artificial reefs within the SCDRS. The combination of these tools and the continuation of physical habitat assessments after reef construction will provide detailed information on reef maturation and performance.

Continually, assessments have focused not only on the fish community, but a newer component of our work also places importance on lower trophic levels. Since 2012, zooplankton have been collected throughout the SCDRS to establish an important baseline for the previously undescribed crustacean community within the corridor. These collections will aide in understanding how invertebrate dynamics impact recruitment and larval fish condition. Our current analysis of the composition, abundance, and biomass of zooplankton provides essential information on how these species pass through the system, moving through the rivers and Lake St. Clair and then ultimately entering Lake Erie, thus connecting how important fish prey items are potentially utilized between Great Lakes. The results provide not only an additional component to characterize the ecology of the system, but to help identify how restoration efforts impact important non-target species.

The overall goals of the SCDRS work would not be possible without essential collaboration across agencies and institutions. Currently, GLSC scientists are working with Ohio Department of

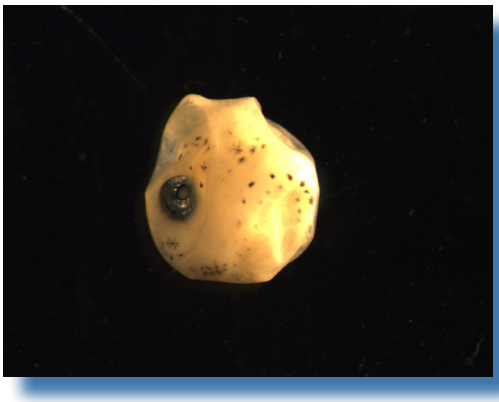
...continued on p. 11





§*Photos from BIO 305 "Marine Juvenile Production", April 2014, during final sampling of larval food quality experiment.*

North Central Region...cont'd from p. 10



Collected lake whitefish Coregonus clupeaformis *egg.*

Natural Resources and the University of Toledo where Masters of Science candidate Brian Schmidt (mentored by Dr. Chris Mayer) is assessing walleye spawning and larval production in the Maumee River, a major tributary to western Lake Erie. Brian is continuing collections of ichthyoplankton in the Maumee River, now in the fifth year, to assess phenology and production of larval fishes with a focus on walleye. He is also assessing the spatial extent of spawning by walleye and mapping the spatial extent of spawning substrate in the Maumee River to determine the amount of habitat available for walleye and other lithophilic spawners, such as lake sturgeon. This work will provide new information about suitability of available spawning habitat in the river and help guide decision making related to restoration of habitats and populations.

Lastly, Dr. Ed Roseman (GLSC) is working together with colleagues Drs. Ed Rutherford (NOAA Great Lakes Environmental Research Laboratory), Tomas Höök (Purdue University), and Stuart Ludsin (Ohio State University) to organize and moderate a special theme session titled "Ecology, Modeling, and Emerging Issues for Fish Early Life History in the Laurentian Great Lakes" at the 2014 Larval Fish Conference in Québec City. This session will feature one dozen presentations about ELH studies ongoing in the basin.

Recent Publications

Francis, J., J.A. Chiotti, J. Boase, M. Thomas, B. Manny, and E.F. Roseman. 2014. An assessment of the nearshore fish communities in the St. Clair-Detroit River system. *Journal of Great Lakes Research*, In press.

Hondorp, D.W., E.F. Roseman, B.A. Manny, P.W. Seelbach, K.R. Newman, and R.M. Strach. 2014. An ecological basis for fish habitat restoration in the Huron-Erie Corridor. *Journal of Great Lakes Research*, In press.

McDonald, E., S. McNaught, and E.F. Roseman. 2014. Use of main channel and two wetland habitats by larval fishes in the Detroit River. J*ournal of Great Lakes Research*, In press.

Pritt, J.J., M.R. DuFour, C.M. Mayer, E.F. Roseman, and R.L. DeBruyne. 2014. Sampling little fish in big rivers: Larval fish detection probabilities in two Lake Erie tributaries. *Transactions of the American Fisheries Society*, In press.

Pritt, J., E.F. Roseman, and T.P. O'Brien. 2014. Mechanisms driving recruitment variability: Comparisons between Great Lakes and marine systems. *ICES Journal of Marine Science*, In press.

Roseman, E.F. 2014. Diet and habitat use by age-0 deepwater sculpins in northern Lake Huron, Michigan and the Detroit River. *Journal of Great Lakes Research*, In press.

George, E.M., E.F. Roseman, B. Davis, and T.P. O'Brien. 2013. Feeding ecology of pelagic larval burbot *Lota lota* in northern Lake Huron, Michigan. *Transactions of the American Fisheries Society* 142: 1716-1723.

Roseman, E.F., and T.P. O'Brien. 2013. Inshore-offshore distribution of larval fish in northern Lake Huron. *Journal of Aquatic Ecosystem Health and Management* 16:211-221.

Stott, W., Ebener, M.P., Mohr, L., Hartman, T., Roseman, E.F., Johnson, J.E. 2013. Spatial and temporal genetic diversity of lake whitefish from northern Lake Huron and western Lake Erie. A*dvances in Limnology*.

O'Brien, T.P., W.W. Taylor, A.S. Briggs, and E.F. Roseman. 2012. Influence of water temperature on rainbow smelt spawning and early life history dynamics in St. Martin Bay, Lake Huron. *Journal of Great Lakes Research* 38:776-785.

Roseman, E.F., G. Kennedy, B.A. Manny, J. Boase, and J. McFee.

...continued on p. 13

Various zooplankton species collected within the St. Clair-Detroit River system (dyed for easier identification).

Publications

Available now: *Proceedings of the 36th Annual Larval Fish Conference .*

Edited by H.I. Browman and A.B. Skiftesvik.

Published in *ICES Journal of Marine Science* 71(4). 2014.

The themed set of articles that follows this introduction contains a selection of the papers that were presented at the 36th Annual Larval Fish Conference (ALFC), convened in Osøyro, Norway, 2–6 July 2012. The conference was organized around four theme sessions, three of which are represented with articles in this collection: "Assessing the relative contribution of different sources of mortality in the early life stages of fishes"; "The contribution of mechanistic, behavioural, and physiological studies on fish larvae to ecosystem models"; "Effects of oil and natural gas surveys, extraction activity and spills on fish early life stages." Looking back at the main themes of earlier conferences about the early life history of fish reveals that they were not very different from those of ALFC2012. Clearly, we still have a lot of work to do on these and other topics related to the biology and ecology of fish early life stages. §

Other Publications

A Handbook to Help Identify Hudson River Fish Larvae. By L. G. Arvidson and J. B. Alber. Published by the authors, Rosendale, New York. 2013.

Larval Fish Aquaculture. Edited by Jian G. Quin. Published by Nova Science Publishers, Inc.. ISBN:978-1-62417-899-3. 2013

Zooplankton of the Atlantic and Gulf Coasts: A Guide to Their Identification and Ecology. 2nd edition. By William S. Johnson and Dennis M. Allen. Published by Johns Hopkins University Press. ISBN-13:978-1421406183. 2012.

Larval Fish Nutrition. Edited by G. Joan Holt. Published by Wiley-Blackwell. ISBN-0813817927. 2011.

Identification of Eggs and Larvae of Marine Fishes. Edited by A.W. Kendall, Jr. Published by Tokai University Press. ISBN-978-4-486-03758-3. 2011.

Ecology of Estuarine Fishes: Temperate Waters of the Western North Atlantic. By Kenneth W. Able and Michael P. Fahay. Published by Johns Hopkins University Press. ISBN-0801894719. 2010.

Early stages of marine fishes occurring in the Iberian Peninsula. P. Ré and I. Meneses. Published by IPIMAR/IMAR. ISBN-978-972-9372-34-6.

Ecology of Anguilliform Leptocephali: Remarkable Transparent Fish Larvae of the Ocean Surface Layer. M.J. Miller. Published by Aqua-BioScience Monographs. TERRAPUB. 2009.

Advances in Early Life History Study of Fish. C. Clemmesen, A.M. Malzahn, M.A. Peck, and D. Schnack, eds. *Scientia Marina*, volume 73S1, Supplement 1. Consejo Superior de Investigaciones Cientificas. 2009.

Plankton. A Guide to Their Ecology and Monitoring for Water Quality. I.M. Suthers & D. Rissik. Published by CSIRO Publishing, 272 pp. 2009. ISBN: 9780643090583.

Manual of Recommended Practices for Modelling Physical – Biological Interactions during Fish Early Life. Edited by E.W. North, A. Gallego, and P. Petitgas, Jr. ICES Cooperative Research Report No. 295. 111 pp. 2009. ISBN: 978–87–7482–060–4.

Early Life History of Marine Fishes. B.S. Miller and A.W. Kendall, Jr. Published by University of California Press. ISBN: 978-0-520-24972-1. 2009.

Fish Larval Physiology. R.N. Finn and B.G. Kapoor. Published by Science Publishers. ISBN: 1578083885. 2008.

Reproductive Biology and Early Life History of Fishes in the Ohio River Drainage

Volume VI, Elassomidae and Centrarchidae. Edited by R. Wallus and T.P. Simon. Published by CRC Press. ISBN 978-0-8493-1923-8. 2008; 472 p.

Volume V, Aphredoderidae through Cottidae, Moronidae, and Sciaenidae. Edited by R. Wallus and T.P. Simon. Published by CRC Press. ISBN 978-0-8493-1921-1. 2006; 360 p.

...continued on p. 13

Publications...cont'd from p. 12

Volume IV, Percidae – Perch, Pikeperch, and Darters. T.P. Simon and R. Wallus. Published by CRC Press. ISBN 978-0-8493-1920-4. 2006; 648 p.

Volume III, Ictaluridae – Catfish and Madtoms. T.P. Simon and R. Wallus. Published by CRC Press. ISBN 0849319196. 2003; 232 p.

Ecology of Juvenile Salmon in the Northeast Pacific Ocean: Regional Comparisons. Edited by C. B. Grimes, R. D. Broder, L. J. Halderson and S. M. McKinnell. American Fisheries Society, Symposium 57, Bethesda, MD. 2007.

Early Stages of Fishes in the Western North Atlantic Ocean: Davis Strait, Southern Greenland and Flemish Cap to Cape Hatteras. Michael P. Fahay. Published by North Atlantic Fisheries Organization.

Early Development of Four Cyprinids Native to the Yangtze River, China. Edited by D.C. Chapman. *U.S. Geological Survey Data Series* 239. 2006. accessible online at *pubs.usgs.gov/ds/2006/239*

Recent Advances in the Study of Fish Eggs and Larvae. Edited by M.P. Olivar and J.J. Govoni. Published in *Scientia Marina*, Volume 70S2 Supplement 2. ISSN: 0214-8358. 2006.

Eggs and Larvae of North Sea Fishes. P. Munk and J.G. Nielsen. Published by Biofolia Press. ISBN 0849319161. 2005.

Early Stages of Atlantic Fishes: An Identification Guide for the Western Central North Atlantic. Edited by W.J. Richards. Published by CRC Press. ISBN 0849319161. 2005.

Developmental Biology of Teleost Fishes. Y.W. Kunz. Published by Springer Press. ISBN 1-4020-2996-9. 2004.

Early Life History of Fishes in the San Francisco Estuary and Watershed. Edited by F. Feyrer, L.R. Brown, R.L. Brown, and J.J. Orsi. Published by the American Fisheries Society. ISBN 1-888569-59-X. 2004.

Freshwater Fishes of the Northeastern United States - A Field Guide. R.G. Werner. Published by Syracuse University Press. ISBN 0815630204. 2004.

The Development of Form and Function in Fishes and the Question of Larval Adaptation. Edited by J.J. Govoni. Published by the American Fisheries Society. ISBN 1-888569-58-1. 2004.

The Larvae of Indo-Pacific Coastal Fishes: An Identification Guide to Marine Fish Larvae. (2nd edition). J.M. Leis and B.M. Carson-Ewart. Published by Brill Academic Publishers. ISBN 90-04-13650-9. 2004.

The Big Fish Bang. Proceedings of the 26th Annual Larval Fish Conference. Edited by H.I. Browman and A.B. Skiftesvik. Published by the Institute of Marine Research, Bergen, Norway. ISBN 82-7461-059-8. 2004.

Fishery Science: The Unique Contributions of Early Life Stages. Edited by Lee A. Fuiman and Robert G. Werner. Published by Blackwell Publishing. ISBN 0-632-05661-4. 2002. §

Western Region...cont'd from p. 6

To more fully documented the early morphological development of suckermouth minnow, and thereby better facilitate identification of collected larvae, we've prepared eight detailed, three-view illustrations from a recently hatched 4.7 mm TL protolarva to a 40.2 mm TL young-of-the-year juvenile. Notable, possibly diagnostic, features include: 1) a mouth that forms and remains in a subterminal to ventral position; 2) prominent, widely separated lower lip lobes beginning with flexion mesolarvae; 3) eyes that are dorso-ventrally flattened in protolarvae, becoming deltoid in mesolarvae through recently transformed juveniles; 4) unusually large pectoral fin buds in later protolarvae and mesolarvae; 5) dorsal fin origin anterior to pelvic fin origin beginning in metalarvae; 6) very sparsely pigmented dorsum in protolarvae and flexion mesolarvae; 7) a more but variably pigmented ventrum between heart and vent in late protolarvae and mesolarvae, often at least partially outlining the ventrolateral aspects of the gut anteriorly and the ventral fin fold posteriorly; 8) a dark caudal spot forming in recent metalarvae and becoming prominent in later metalarvae and juveniles; and 9) prominent patterns of sensory papillae on the lower lateral and ventral surfaces of the head from postflexion mesolarvae through recently transformed juveniles. Morphometric and meristic data can be reliably extracted from the drawings. The drawings of a late protolarva and recently transformed flexion mesolarvae match quite well with the description referenced above. §

North Central Region...cont'd from p. 11

2012. Life history characteristics of a recovering lake whitefish *Coregonus clupeaformis* stock in the Detroit River, North America. Proceedings of the 10th Coregonid Fishes Symposium. *Advances in Limnology* 63:477-501.

Roseman, E.F., B.A. Manny, J. Boase, G. Kennedy, M. Child, J. Craig, K. Soper, and R. Drouin. 2011. Lake Sturgeon Response to a Spawning Reef Constructed in the Detroit River. *Journal of Applied Ichthyology* 27(Suppl 2):66-76.

Roseman, E.F., J. Boase, G.W. Kennedy, and J. Craig. 2011. Adaptation of two techniques for sampling fish eggs and larvae in deep rivers. *Journal of Applied Ichthyology* 27(Suppl 2):89-92.

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Northeast Region...cont'd from p. 5

by seine during efforts at East River (September 2011, n = 1) and Hudson River (September 2012, n = 3).

Abundances of larval flatfish species have also varied locally during our long-term ichthyoplankton sampling at Little Sheepshead Creek inside Little Egg Inlet. Over the last 24 years (Able and Fahay 2010), they have seen diverse flatfish species, including *Scophthalmus aquosus, Etropus microstomus, Paralichthys dentatus, Pseudopleuronectes americanus* and *Citharichthys spilopterus.* Although the abundances of these species vary annually, two species, *C. spilopterus* and *E. microstomus*, showed seemingly uncharacteristic variation in abundances in 2011. *E. microstomus* (n = 1,217) was present each year from 1989 through 2012. However, *C. spilopterus* (n = 89) was only present during four of those years (1993, 1994, 2007, 2011). Other efforts focused on juvenile and adult flatfish distribution and dynamics of habitat use (Able and Fodrie, in press) and temporal variation in *Pseudopleuronectes americanus* recruitment (Able et al., in press).

As part of a broader interest in early life history stages that act as piscivores, they determined that *Conger oceanicus* elvers are predators on glass eels and elvers of *Anguilla* and other *Conger* while *Anguilla* only occasionally preys on other *Anguilla rostrata*. These interactions are likely limited to the higher salinity portions of estuaries where they overlap in time and space (Musumeci at al. 2013). Other recent publications include an evaluation of New Jersey surf zones as nurseries (Able et al. 2013), and the response of juvenile *Lutjanus griseus* captured in New Jersey estuaries to winter mortality and climate change (Wuenschel et al. 2012). Other efforts on juvenile fishes have used acoustic telemetry to evaluate habitat use in urban estuaries (Able et al. 2013)

Several of the long term residents of RUMFS are moving on. Jenna Rackovan is leaving her technician position to begin graduate school at the University of New Hampshire. Maria Berezian will be starting at Drexel University and Dana Christensen will begin at University of Delaware in the fall.

Recent and Pending Publications

Able, K.W., M.J. Wuenschel, T.M. Grothues, J. Vasslides, and P. Rowe. 2013. Do surf zones in New Jersey provide "nursery" habitat for southern fishes? *Environmental Biology of Fishes* 96: 661-675.

Able, K. W. and M. P. Fahay. 2010. Ecology of Estuarine Fishes: *Temperate Waters of the Western North Atlantic*. Johns Hopkins University Press, Baltimore, MD. 566 p.

Able, K. W., and F. J. Fodrie. (In press) Distribution and dynamics of habitat use by juvenile and adult flatfishes. Book chapter to be published in new edition of R.N. Gibson (editor), *Flatfishes: Biology and Exploitation* (2nd edition).

Able, Kenneth W., J. M. Smith, and J. Caridad. (In review.) American eel supply to an estuary and tribuatries: Spatial variation in Barnegat Bay, NJ. *Northeastern Naturalist*.

Able, K. W., T. M. Grothues, I. M. Kemp. 2013. Fine-scale distribution of pelagic fishes relative to a large urban pier. *Marine Ecology Progress Series* 476:185-198.

Able, K. W., T. M. Grothues, J. M. Morson, and K. E. Coleman. (In press). Temporal variation in winter flounder recruitment at the southern margin of their range: Is the decline due to increasing temperature? *ICES Journal of Marine Science.*

Musumeci, V. L., K. W. Able, M. C. Sullivan, and J. M. Smith. 2013. Estuarine predator-prey interactions in the early life history of two eels (*Anguilla rostrata* and *Conger oceanicus*). *Environmental Biology of Fishes* DOI 10.1007/s10641-013-0194-7.

Wuenschel, M.J., J.A. Hare, M.E. Kimball and K.W. Able. 2012. Evaluating juvenile thermal tolerance as a constraint on adult range of gray snapper (*Lutjanus griseus*): a combined laboratory, field and modeling approach. *Journal of Experimental Marine Biology and Ecology* 436-437: 19-27. §

President's Message...cont'd from p. 1

the coming years are very encouraging. This reflects the dedication of our members to support our section and the decisions where to go in the future will be tough ones. This year we have the opportunity to meet with our mother organization to demonstrate our expertise and advertise for our section. I will be doing this at the governing board meeting in Québec City and you all can do that by exchanging ideas and thoughts at the scientific meetings. I'm sure it will be a great conference and from what I have seen and heard Québec City is fabulous. So, come and join us there!

What have we achieved during the last two years? We have a great group of dedicated people and we are in good financial shape. We were able again to support student travel (see the LFC homepage for details) and will try to find a way to keep that going for the next years. We have earned a lot of international recognition, we share a cooperate identity and our meetings are well attended. The raffles and the gifts the attendees are bringing to our meetings are great and the support we have received from the membership and community for the Sally Richardson Award and John Blaxter Award are outstanding. What is there to complain about? Well, the membership numbers are good, but not as good as they could be. We all have tried to convince people to join our section, encouraging them that it really is worthwhile and is not difficult to sign up for membership. The problem is that one has to do it every year, and members tend to forget about paying their dues. I could have been more "pressing, but I will now leave that up to Myron. Something we have started to think about, but not really followed through is the stronger integration of younger scientist to take over a leading role in our section. I will use the last phase of my presidency to

...continued on p. 16

Southern Region...cont'd from p. 3

the marine environment is increasing in expanse and intensity due to a surge in human activities, including construction, oil and gas drilling, military operations, and shipping and boating traffic (Andrew et al. 2002, Hildebrand 2009). The effects of increasing noise pollution on marine organisms are beginning to receive attention, but most studies to date have focused on marine mammals.

For many species in the Gulf of Mexico, eggs and young larvae travel through tidal inlets from offshore to the bays, and in the process are exposed to a large amount of anthropogenic noise, especially shipping traffic. To determine the effects of noise on larval behavior, PhD student Lisa Havel and her collaborators conducted experiments on red drum, *Sciaenops ocellatus*, a common estuarine fish in the Gulf of Mexico, and an important component of the local recreational fishery. The acoustic soundscape in the Aransas Pass Ship Channel, the inlet connecting the Gulf of Mexico to the bays surrounding the UT Marine Science Institute, was recorded in order to characterize the noise levels to which the local pelagic larvae are exposed (see figure at right). Through collaboration with Dr. Dennis Higgs (University of Windsor), the auditory evoked potential (AEP) of red drum larvae was quantified to resolve auditory thresholds. Then, larvae were tested for behavioral performance in response to acoustical stimuli of amplitudes comparable to those measured in the field.

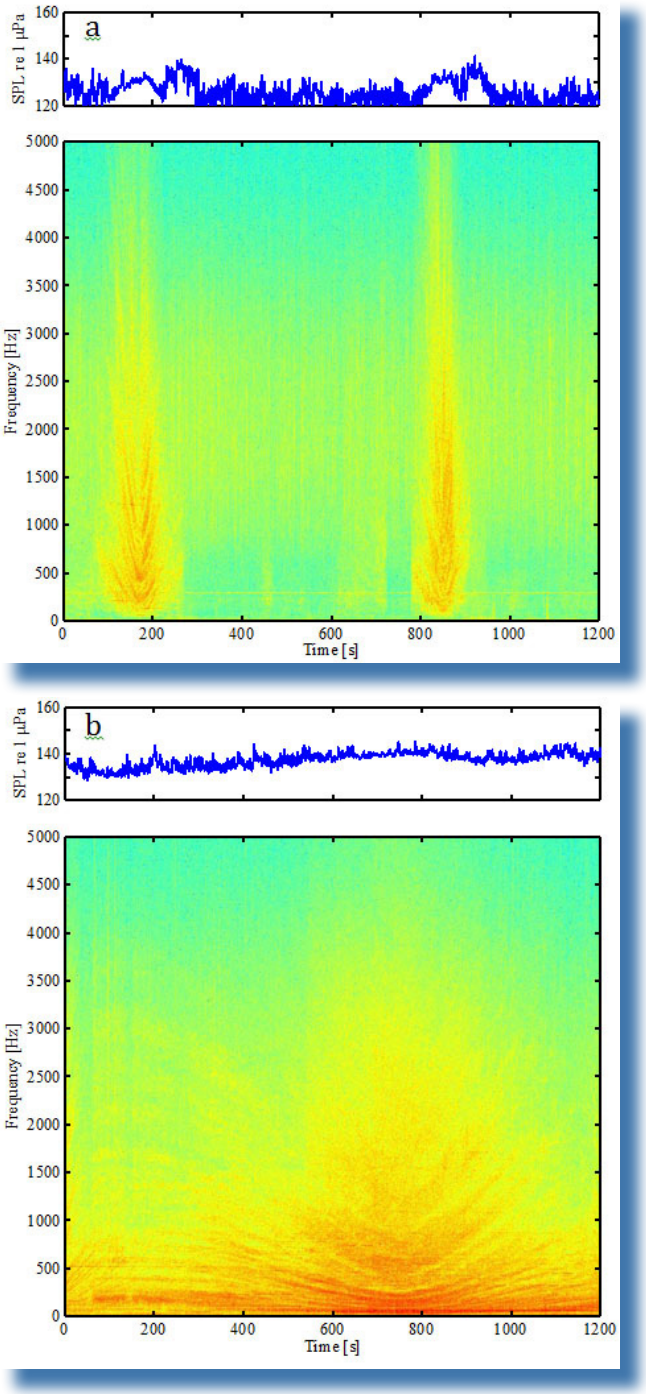
From the AEP, it was clear that larvae were capable of hearing anthropogenic noise at the ecologically relevant levels used in the experiment. Larvae decreased their activity when the sound was on, compared to silent controls. They spent less time swimming, which resulted in a lower turning rate and slower mean speed over the study period. Their number of pauses during swimming was not affected, but the duration of each pause increased when in the presence of sound. There was a decrease in mean speed with an increase in noise amplitude, but no change in the number of turns, pauses, or activity.

This study was followed by a laboratory experiment that quantified the reactive distance of red drum larvae to their prey using high-speed videography. This was done in order to calculate the difference in the volume of water that larvae could search while foraging when in the presence of loud noises vs. more quiet conditions. For every hour exposed to anthropogenic sound, the researchers estimated that larvae would search approximately 10% less than in a quiet environment. Considering red drum spend three weeks in the water column before reaching the quieter bays and estuaries, this reduction could have significant consequences for their prey encounter rates, and consequently, fitness.

References:

Andrew RK, Howe BM, Mercer JA, Dzieciuch MA (2002) Ocean ambient sound: comparing the 1960s with the 1990s for a receiver off the California coast. *Acoustics Research Letters Online* 3:65-70.

Hildebrand JA (2009) Anthropogenic and natural sources of ambient noise in the ocean. *Marine Ecology Progress Series* 395:5-20 §



The acoustical soundscape of the Aransas Pass Ship Channel, February 6, 2012 with (a) two small outboard boats and (b) a larger tanker passing by. The upper graph in (a) and (b) representents the underwater amplitude (sound pressure level) for all sound in the 0 – 5000 Hz frequency range over time. The lower graphs represent amplitude (warmer shades = louder) for each frequency over the same time period. Graphs courtesy of Dr. Theodore Argos, created on Matlab.

North Central Region...cont'd from p. 13

Stott, W., Ebener, M.P., Mohr, L., Schaeffer, J., Roseman, E.F., Harford, W.J., Johnson, J.E., and Fietsch, C.L. 2012. Genetic structure of lake whitefish populations in the northern main basin of Lake Huron. *Advances in Limnology* 63:241-260. §

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Stages is published in February, June, and October each year. It is assembled by the Newsletter Editor with contributions from several Regional Representatives and other individuals. Please send any articles, announcements, or information of interest to Early Life History Section members or affiliates to your local Regional Representative or to the Editor.

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Please specify the membership year(s) for which you are paying dues. Make checks or money orders payable to "AFS-ELHS."

Western Region...cont'd from p. 7

The Cagayan River is the largest river in the Philippines with a drainage area of 27,280 km^2 at its mouth in Aparri. The Cagayan River, which is the main drainage channel of the basin, flows in a northerly direction from its head waters in Nueva Vizcaya to its mouth in the Babuyan Channel near Aparri. Its principal tributaries include the Siffu-Malling, Chico, Ilagan and Magat Rivers. The estimated annual discharge is 53,943 million m^3.

For more information on the Cagayan River's ludong and catfish conservation, and how to team with us, please contact Gilles Ouellette at: safari.extremefishing@yahoo.com. §

President's Message...cont'd from p. 14

approach people and hope to come up with some more detailed ideas at our business meeting in Québec City.

Well, now that my presidency is going to end soon, I'd like to thank everyone for their support in the last two years. It was an honor to serve our section as President.

With this, I wish you all success with your research and enjoyment with the interesting work you all are doing and hope to see many of you in Québec City in August. §

— Catriona Clemmesen-Bockelmann,
President